

**CURRICULUM VITAE
BRIAN HELMUTH**

CONTACT

University of South Carolina
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EDUCATION

Ph.D. 1997 University of Washington; Zoology
M.S. 1991 Northeastern University; Biology (Marine Biology)
B.S. 1989 Cornell University; Biology (Ecology and Evolution)

PROFESSIONAL EXPERIENCE

Associate Professor, University of South Carolina, Columbia, July 2004-present.
Assistant Professor, University of South Carolina, Columbia, June 1999-July 2004.
Instructor, Three Seas East-West Marine Biology Program, Moorea, French Polynesia 2005-present
Instructor, Three Seas East-West Marine Biology Program, Jamaica 2003, 2004.
Post Doctoral Researcher, Stanford University, California, 1997-1999

AWARDS, HONORS, AND FELLOWSHIPS

Aldo Leopold Leadership Program, Fellowship, 2005
Marine Educator of the Year, South Carolina Marine Educators Association, March 2003.

GRANTS IN SUPPORT OF RESEARCH

National Aeronautics and Space Administration, "Viewing the world through nonhuman eyes: exploring the links between remote sensing, climate change and coastal ecosystems." 4/07-3/10. \$44,775.
National Aeronautics and Space Administration, "Ecological forecasting and hindcasting of biodiversity responses to climate change: from MODIS to mussels." Helmuth (PI) with D.S. Wethey, T.J. Hilbish and V. Lakshmi (USC Geology). 3/07-3/10. \$1,416,738.
NOAA Ecofore: Ecological forecasting: responses of ecosystem foundation species in the coastal zone to climate change (co-PI with D.S. Wethey [PI], T.J. Hilbish, S. Woodin, V. Lakshmi, and H. Power); 11/01/04-10/31/09, \$2,478,118.
National Aeronautics and Space Administration, "Climate change and intertidal biogeography: coupling remote sensing data to thermal physiology across a cascade of scales." (Helmuth [PI] with D.S. Wethey, T.J. Hilbish and V. Lakshmi) 3/04-3/07; \$1,050,000.
National Science Foundation, "Climate change and patterns of body temperature in intertidal ecosystems" 09/03 - 08/06; \$234,000.

National Science Foundation, “Biophysical and behavioral agents of natural selection in a hybrid zone”, (co-PI with T.J. Hilbish [PI] and D.S. Wethey), 3/02 – 2/04, \$220,209.

National Geographic Society, “Latitudinal patterns in thermal stress: linking physiology, ecology and climate change (co-PI with Gretchen Hofmann), 2/02- 10/03. \$20,050. (\$11,000 to Helmuth)

National Science Foundation. “Physical Ecology of the Rocky Intertidal: predicting patterns in invertebrate body temperatures” 4/00- 3/03, \$287,000.

National Undersea Research Center, “Decoupling the effects of mass transfer, water motion and temperature on reef health.” (co-PI with DS Wethey [PI] and C Finelli) 1/02 – 12/03, \$49,953.

South Carolina BRIN/EpScOR program, “Characterizing the thermal ecology of fiddler crabs” (Helmuth [PI] with R. Brodie and M. Crowe) 7/02-7/03. \$25,000.

National Science Foundation, “Symposium: Physiological ecology of rocky intertidal organisms: from molecules to ecosystems.” 11/ 01 – 11/02. \$6000.

National Science Foundation. BIOCOMPLEXITY--INCUBATION ACTIVITY: Linking ecology, physiology and climate change: Influence of environmental stress on community structure in the rocky intertidal. (co-PI with G. Hofmann [PI], B. Menge and A. Kinzig) 7/00–6/01. \$61,896.

Smithsonian Institution, Caribbean Coral Reef Ecosystems program. “Uncovering the roles of environment and physiology in the alternating competitive dominance of two coral species’ (Helmuth [PI] with K.P. Sebens, E. Carrington and J. Leichter) 1/01 – 12/02.

Smithsonian Institution. Quantifying the role of “physical factors” in the life history of the coral *Agaricia tenuifolia* (Helmuth [PI] with I. Macintyre and B. Timmerman). May 1998.

Smithsonian Institution. The interplay of host morphology and symbiont microhabitat: consequences of aggregation structure of the coral *Agaricia tenuifolia* (Helmuth [PI] with I. Macintyre and B. Timmerman). March 1997.

Smithsonian Institution. Consequences of aggregation structure, habitat complexity and colony morphology to mass flux in scleractinian corals (co-PI with I. Macintyre). March 1996.

Smithsonian Institution. Effects of water movement on the distribution and morphology of reef corals (co-PI with K.P. Sebens [PI]). March 1994, March 1995.

PEER-REVIEWED PUBLICATIONS (* indicates student authors)

38. Broitman, B.R., N. Mieszkowska, **B. Helmuth**, and C.A. Blanchette. 2008. Assessing effects of climate on recruitment of rocky shore intertidal invertebrates in the Eastern North Atlantic. **Ecology** In Press.
37. Szathmary*, P.L., **B. Helmuth**, and D. S. Wethey. 2008. Climate change in the rocky Intertidal zone: predicting and measuring the body temperature of a keystone predator. **Mar. Ecol. Prog. Ser.** In press.
36. Pincebourde, S., E. Sanford and **B. Helmuth**. 2008. Body temperature during low tide alters the feeding performance of a top intertidal predator. **Limnol. Oceanogr.** 53(4): 1562-1573.
35. Jost*, J. and **B. Helmuth**. 2007. Morphological and ecological determinants of body temperature of the Atlantic ribbed mussel, *Geukensia demissa*, and their effects on mussel mortality. **Biol. Bull.** 213: 141-151
34. Finelli, C.M., **B.S. Helmuth**, N.D. Pentcheff and D.S. Wethey. 2007. Intracolony variability in photosynthesis by corals is affected by water flow: a role for oxygen transport? **Mar. Ecol. Prog. Ser.**, 349:103-110.

33. Schneider*, KR and **B. Helmuth** 2007. Spatial variability in habitat temperature drives patterns of selection between and invasive and native mussel species. **Mar. Ecol. Prog. Ser.** 339: 157-167.
32. Blanchette, C.A., S.D. Gaines and **B. Helmuth**. 2007. Environmental determinants and biogeographic patterns of abundance, size and growth of the intertidal dominant, *Mytilus californianus*, around Point Conception, California. **J. Exp. Mar. Biol. Ecol.**, 340(2): 126-148.
31. Gilman, S., C.D.G. Harley, D. Strickland*, O. Vanderstraeten, M. O'Donnell, and **B. Helmuth**. 2006. Evaluation of "Effective Shore Level" as a method of characterizing intertidal wave exposure regimes. **Limnol. Oceanogr. Methods**, 4:448-457.
30. **Helmuth, B.**, B.R. Broitman, C.A. Blanchette, S. Gilman, P. Halpin, C.D.G. Harley, M.J. O'Donnell, G.E. Hofmann, B. Menge, and D. Strickland. 2006. Mosaic patterns of thermal stress in the rocky intertidal zone: implications for climate change. **Ecol. Monogr.**, 76(4):461-479.
29. Gilman, S.E., D.S. Wethey and **B. Helmuth** 2006. Variation in the sensitivity of organismal body temperature to climate change over local and geographic scales. **Proc. Natl. Acad. Sci**, 103 (25): 9560-9565.
28. Leichter, J.J., **B. Helmuth**, and A. Fischer. 2006. Variation beneath the surface: quantifying complex thermal environments on coral reefs in the Caribbean, Bahamas, and Florida **J. Mar. Res.**, 64(4): 563-588.
27. Rotjan, R.D., J.L. Dimond, D.J. Thornhill, J.J. Leichter, **B. Helmuth**, D.W. Kemp and S.M. Lewis. 2006. Chronic fish grazing impedes coral recovery after bleaching. **Coral Reefs**, 25(3): 361-368.
26. Finelli, C.M., **B.S.T. Helmuth**, N.D. Pentcheff, and D.S. Wethey. 2006. Water flow influences oxygen transport and photosynthetic efficiency in corals. **Coral Reefs** 25(1):47-57.
25. Castillo*, K.D. and **B.S.T. Helmuth**. 2005. Influence of thermal history on response of *Montastraea annularis* to short-term temperature exposure. **Marine Biology**, 148(2): 261-270.
24. Schneider*, K. R., D. S. Wethey, **B. Helmuth**, and T. J. Hilbish. 2005. Implications of movement behavior on mussel dislodgement: exogenous selection in a *Mytilus* spp. hybrid zone. **Mar. Biol.** 146: 333-343.
23. Fitzhenry*, T., P.M. Halpin and **B. Helmuth**. 2004. Testing the effects of wave exposure, site, and behavior on intertidal mussel body temperatures: Applications and limits of temperature logger design. **Mar. Biol.** 145(2):339-349.
22. Denny, M.W. **B. Helmuth**, G.L. Leonard, C,D,G, Harley, L.Hunt and E. Nelson. 2004. Quantifying scale in ecology: lessons from a wave-swept shore. **Ecol. Monogr.**, 74(3):513-532.
21. Harley, C.D.G. and **B.S.T. Helmuth**. 2003. Local and regional scale effects of wave exposure, thermal stress, and absolute vs. effective shore level on patterns of intertidal zonation. **Limnol. Oceanogr.**, 48: 1498-1508
20. **Helmuth, B.** and M.W. Denny. 2003. Predicting wave exposure in the rocky intertidal zone: do bigger waves always lead to larger forces? **Limnol. Oceanogr.**, 48: 1338-1345.
19. Denny, M.W., L.P. Miller, M.D. Stokes, L.J.H. Hunt, and **B.S.T. Helmuth**. 2003. Extreme water velocities: Topographical amplification of wave-induced flow in the surf zone of rocky shores. **Limnol. Oceanogr.** 48: 1-8.
18. Sebens, K.P., **B. Helmuth**, E. Carrington and B. Agius. 2003. Effects of water flow on growth and energetics of the scleractinian coral *Agaricia tenuifolia*, in Belize. **Coral Reefs** 22(1): 35-47.
17. **Helmuth, B.**, C.D.G. Harley, P. Halpin, M. O'Donnell, G.E. Hofmann and C. Blanchette. 2002. Climate change and latitudinal patterns of intertidal thermal stress. **Science** 298:1015-1017.

16. **Helmuth B.** 2002. How do we measure the environment? Linking intertidal thermal physiology and ecology through biophysics. **Int. Comp. Biol.**, 42(4): 837-845.
15. Tomanek, L. and **B. Helmuth.** 2002. Physiological ecology of rocky intertidal organisms: a synergy of concepts. **Int. Comp. Biol.**, 42(4): 771-775.
14. **Helmuth B.** and GE Hofmann. 2001. Microhabitats, thermal heterogeneity and physiological gradients of stress in the rocky intertidal zone. **Biol. Bull.**, 201:374-384.
13. **Helmuth B.** 1999. Thermal biology of rocky intertidal mussels: quantifying body temperatures using climatological data. **Ecology** 80(1): 15-34.
12. Denny M.W., B. Gaylord, **B. Helmuth** and T.L. Daniel. 1998. The menace of momentum: dynamic forces on flexible organisms. **Limnol. Oceanogr.** 43:955-968.
11. **Helmuth B.S.T.** 1998. Intertidal mussel microclimates: Predicting the body temperature of a sessile invertebrate. **Ecol. Monogr.**, 68 (1):29-52.
10. Sebens K.P., S.P. Grace, **B. Helmuth**, E.A. Maney, Jr. and J.S. Miles 1998. Water flow and prey capture by three scleractinian corals, *Madracis mirabilis*, *Montastrea cavernosa* and *Porites porites* in a field enclosure. **Mar. Biol.** 131:347-360.
9. Daniel TL, **BS Helmuth**, WB Saunders, and PD Ward. 1997. Septal complexity in ammonoid cephalopods increased mechanical risk and limited depth. **Paleobiology**, 23:470-481.
8. **Helmuth B.S.T.**, K.P. Sebens and T.L. Daniel. 1997. Morphological variation in coral aggregations: branch spacing and mass flux to coral tissues. **J. Exp. Mar. Biol. Ecol.**, 209: 233-259.
7. **Helmuth B.S.T.**, E.F. Stockwell and D.R. Brumbaugh. 1997. Morphological and environmental determinants of mass flux to corals, **Proc. 8th Int. Coral Reef Symp., Panama**, 2:1103-1108.
6. **Helmuth B.S.T.**, B.E.H. Timmerman, and K.P. Sebens. 1997. Interplay of host morphology and symbiont microhabitat in coral aggregations. **Mar. Biol.**, 130:1-10.
5. Sebens K.P., J. Witting, and **B. Helmuth**, 1997. Effects of water flow and branch spacing on particle capture by the reef coral *Madracis mirabilis* (Duchassaing and Michelotti). **J. Exp. Mar. Biol. Ecol.**, 211:1-28.
4. Holberton R.L., **B. Helmuth** and J.C. Wingfield. 1996. The corticosterone stress response in Gentoo and King penguins during the non-fasting period. **Condor** 98: 850-854.
3. Padilla D.K., C.D. Harvell, J. Marks and **B. Helmuth.** 1996. Inducible aggression and intraspecific competition for space in a marine bryozoan, *Membranipora membranacea*. **Limnol. Oceanogr.**, 41(3): 505-512.
2. **Helmuth B.**, R.R. Veit and R. Holberton. 1994. Long-distance dispersal of a subantarctic brooding bivalve (*Gaimardia trapesina*) by kelp rafting. **Mar. Biol.** 120: 421-426.
1. **Helmuth B.** and K.P. Sebens. 1993. The influence of colony morphology and orientation to flow on particle capture by the scleractinian coral *Agaricia agaricites* (Linnaeus). **J. Exp. Mar. Biol. Ecol.** 165: 251-278.

BOOK CHAPTERS AND REVIEW ARTICLES (* indicates student authors)

- Mislan*, K.A.S. and **B. Helmuth.** 2008. "Microclimate" In Encyclopedia of Ecology, Edited by S.E. Jørgensen and B. Fath. Elsevier. In press.
- Helmuth, B.** 2007. Forecasting the impacts of climate change on coastal ecosystems: how do we integrate science and policy? **Southeast Environmental Law Journal**, in press.
- Helmuth, B.** 2007. Intertidal life as experienced through a powerful lens (Review of M. Koehl, "Wave-swept shore: the rigors of life on a rocky coast." **Ecology** 88(1):264-265.

- Jost*, J. and **B. Helmuth** 2007. "Measurement of Temperature" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 580-583.
- Schneider*, K.R. and **B. Helmuth** 2007. "Patterns of Heat and Temperature" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 263-266.
- Szathmary*, P.L. and **B. Helmuth** 2007. "Temperature Change" In, *Encyclopedia of Tidepools and Rocky Shores*, edited by M.W. Denny and S.D. Gaines, University of California Press, pp. 578-580.
- Helmuth, B.** N. Mieszkowska, P. Moore and S.J. Hawkins. 2006. Living on the edge of two changing worlds: forecasting the responses of rocky intertidal ecosystems to climate change. **Ann. Rev. Ecol. Evol. Syst.** 37: 373-404.
- Helmuth, B.**, J.G. Kingsolver and E. Carrington, 2005. Biophysics, physiological ecology, and climate change: Does mechanism matter? **Ann. Rev. Physiol.**, 67: 177-201.
- Kaandorp J., J. Kubler et al. 2001. The algorithmic beauty of seaweeds, sponges and corals. Springer, New York.
- Timmerman, B. and **B. Helmuth**. 1998. Marine Life. Chapter 9 in L. Beletsky, *The Ecotravellers' Wildlife Guide to Belize and Northern Guatemala*. Academic Press.
- Helmuth B.**, R.R. Veit and R. Holberton. 1994. Dispersal of benthic invertebrates in the Scotia Arc by kelp rafting. **Antarctic J. U.S.**, 29(5): 145-147.

MANUSCRIPTS IN REVIEW

- Broitman, B.R., L. Szathmary, K.A. Smith*, C.A. Blanchette and **B. Helmuth** Predator-prey interactions under climate change: the importance of habitat vs. body temperature. **Oikos** in review.

INVITED PRESENTATIONS AND SYMPOSIA

58. Fourth International Conference in Africa for Comparative Physiology and Biochemistry. Symposium: Physiological mechanisms in coping with climate change. Maasai Mara National Reserve, Kenya. July 2008
57. Fourth International Conference in Africa for Comparative Physiology and Biochemistry. Symposium: Physiological responses to temperature: Linking ecology with evolution. Maasai Mara National Reserve, Kenya. July 2008.
56. Society of Experimental Biology, Symposium "Climate change: from genes to ecosystems" Marseilles, France. July 2008.
55. Environmental Educators Association of South Carolina, Keynote Address, June 2008.
54. Florida State University, Coastal and Marine Laboratory, Elise B. Newell Seminar Series, March 2008
53. Auburn University, Department of Biological Sciences, January 2008.
52. University of Central Florida, Florida Seagrant Elise B. Newell Seminar Series, January 2008.
51. Clemson University, Department of Biological Sciences, January 2008.
50. CSIRO Symposium (plenary speaker), "In Hot Water: preparing for climate change in Australia's coastal and marine ecosystems." State Library of Queensland, Brisbane, Nov. 2007.
49. Estuarine Research Foundation, Providence, R.I. Nov. 2007 (Symposium, "Evaluating climate records to understand causes and effects of climate variability in coastal systems."

48. University of South Carolina School of Law, "Balancing private and public rights in the coastal zone in the era of climate change" Columbia, SC September 2007
47. American Academy for the Advancement of Science, Invited Speaker, San Francisco, February 2007.
46. Swire Institute of Marine Science, University of Hong Kong, International Conference on Ecophysiology of Marine Organisms, January 2007.
45. Department of Natural Resources, Charleston, SC. October, 2006.
44. University of Georgia, Athens. Institute of Ecology. Athens, GA. September, 2006
43. Joint Workshop on NASA Biodiversity, Terrestrial Ecology, and Related Applied Sciences (Keynote address); Adelphi, MD, August 2006.
42. American Society of Limnology and Oceanography June 2006. (Symposium, "Forecasting Biogeographic Responses to Climate Change in Coastal Ecosystems")
41. University of California Los Angeles, April 2006.
40. University of New England, Maine, April 2006.
39. Institut de Recherche sur la Biologie de l'Insecte, Université de Tours, France, December 2005
38. California State University, Northridge, Department of Biology, November 2005
37. Texas A&M University, Department of Oceanography, October 2005.
36. NASA Biodiversity and Ecological Forecasting meeting, Washington D.C., August 2005
35. BIOINC conference, Instituto de Estudos do Mar Almirante Paulo Moreira, Cabo Frio, Brazil (Keynote Address), July 2005.
34. Centre for Research on the Ecological Impacts of Coastal Cities, University of Sydney, Australia, February 2005.
33. Bowdoin College, Department of Biology, Maine, November 2004.
32. Bamfield Marine Station, British Columbia, Canada. Oct. 2004.
31. Canadian Society of Zoologists, Wolfville, NS, Canada, May 2004 (Intertidal Physiological Ecology Symposium)
30. Benthic Ecology Meetings, Mobile, AL, March 2004 (Symposium: Three Seas East West Marine Biology 20th Anniversary)
29. University of Rhode Island, Department of Biology, Nov. 2003
28. Bamfield Marine Station, British Columbia, Canada. Oct. 2003.
27. University of Delaware, College of Marine Studies, Lewes, DE. Oct. 2003
26. Brown University, Department of Ecology and Evolutionary Biology, Oct. 2003
25. Ecological Society of America, Savannah, GA, Aug. 2003 (Symposium: "Body size, biophysics and biological stoichiometry: from individual function to ecosystem structure")
24. University of California, Berkeley, Department of Integrative Biology. Feb. 2003.
23. International Temperate Reef Symposium, Christchurch, New Zealand, Jan. 2003. (Symposium: "Climate change and temperate reef ecosystems: integrating space and time").
22. Western Society of Naturalists, Monterey, CA, Nov. 2002. (Symposium: "Marine Ecological Patterns at the Large Scale").
21. Bamfield Marine Station, British Columbia, Canada. Nov. 2002.
20. College of Charleston, Department of Biology, Charleston, SC, Sept. 2002.
19. Western Society of Malacologists, Monterey, CA, July 2002. (Symposium: "Ecology of mollusks").
18. University of Washington, Friday Harbor Laboratories, May 2002.
17. South Carolina Marine Educators Association, Hunting Island, SC, March 2002. Keynote address.
16. University of North Carolina, Chapel Hill, Department of Marine Sciences. Jan. 2002.
15. Society for Integrative and Comparative Biology, Anaheim, CA, Jan. 2002. (Co-organizer of Symposium: Physiological Ecology of Rocky Intertidal Organisms: from Molecules to Ecosystems)
14. National Science Foundation, Biocomplexity P.I. Workshop. Oct. 2001.

13. American Society of Limnology and Oceanography, Albuquerque, NM. Feb.2001. (Co-organizer of Symposium: "From Molecules to Ecosystems: a Hierarchy of Mussel Biology")
12. Bodega Bay Marine Laboratory, Bodega, CA, June 2001.
11. Oregon State University, Corvallis, Department of Zoology, May 2000.
10. University of South Carolina, Aiken, Department of Biology and Geology, March 2000.
9. American Society of Limnology and Oceanography, DIALOG III symposium, Bermuda, October 1999.
8. National Center for Ecological Analysis and Synthesis, "Modeling sessile growth" working group. Santa Barbara, CA, Aug. 1999.
7. University of South Carolina, Columbia, Department of Biology, March 1998.
6. University of California, Santa Cruz, Department of Biology, Feb. 1998.
5. University of California, Davis, Division of Biological Sciences, Section of Evolution and Ecology. Jan. 1998.
4. Western Society of Naturalists annual meeting, December 1997. (Symposium: "Biomechanics and ecology: is the marriage working?")
3. Stanford University, Hopkins Marine Station, Pacific Grove, CA. Oct.1997.
2. University of Washington, Seattle, School of Fisheries. June 1997.
1. Eighth International Coral Reef Symposium, Panamá City, Panamá, June 1996. (Symposium: "Flow and coral reefs: from micro- to meso-scale effects").

ADVISORY POSITIONS AND SYNERGISTIC ACTIVITIES

Co-organizer of symposia for Society for Integrative and Comparative Biology (2002) and American Society of Limnology and Oceanography (2001, 2006)

Developed lesson plans and educational outreach website based on research:

<http://www.biol.sc.edu/~helmuthlab>

Board member, South Carolina Marine Educators Association, 2001-2003

Program Officer, Division of Ecology and Evolution, Society for Integrative and Comparative Biology. 2000-2003.

Contributing Editor, *Marine Ecology Progress Series*

COLLABORATORS AND OTHER AFFILIATIONS

Recent Collaborators and Co-authors:

Carol Blanchette, Bernardo Broitman, Emily Carrington, Chris Finelli, Christopher Harley, Stephen Hawkins, Jerry Hilbish, Gretchen Hofmann, Venkat Lakshmi, James Leichter, Bruce Menge, Nova Mieszkowska, Richard Murphy, N. Dean Pentcheff, Laura Petes, Randi Rotjan, David Wetthey, Sally Woodin

Graduate and Post Doctoral Advisors:

Kenneth P. Sebens (M.S. thesis advisor, University of Maryland)

Thomas L. Daniel (Ph.D. advisor, University of Washington)

Mark W. Denny (Post Doctoral Research Advisor, Stanford University)

Students and Post Docs Advised:

Degrees awarded:

Karl Castillo (Ph.D. awarded 2008, USC Marine Science Program)

Maxine Henry (M.S. Awarded 2005, USC Marine Science Program)
Jennifer Jost (Ph.D. awarded 2007, USC Biological Sciences)
Kimberly Schneider (Ph.D. awarded Fall 2006; USC Biological Sciences)
Lauren Szathmary (M.S. awarded 2006, USC Biological Sciences)

Current students:

Allison Smith (Ph.D. student, USC Biological Sciences; 2005-present)
Lauren Yamane (M.S. Student, USC Marine Science Program, 2006- present)

Postdoctoral students;

Sarah Gilman (Post Doctoral Research Associate, 2003-2005)
Sylvain Pincebourde (Post Doctoral Research Associate, 2006-2007)